User's Manual

Logimac 280VM - PLC based control system

Version : September2010

.

TABLE OF CONTENTS

PAGE

System parameters' default settings---- 3
PLC read-only data registers readings ---- 4

1. INTRODUCTION---- 5

1.1 Approvals ---- 5

1.2 Part numbers---- 5

2. HARDWARE DESCRIPTION ---- 6
2.1 PLC configuration ---- 6

2.2 Operator interface ---- 7

2.3 Alarm annunciator---- 8

3.PLC INPUT & OUTPUT CONNECTIONS ---- 10

4. PLC PROGRAM DESCRIPTION ----12
4.1 Initial parameter writing ----12

4.2 Analog input/output reading & scaling.----13

4.3 Starting pump choice. ----16

4.4 Contactor operation. ----17

4.5 Alarms: memorizing, indication, acknowledge, reset----18

4.6 Flushing once a day sequence ----21

4.7 Pump capacity calculation----21

4.8 Pumped volume calculation ----23

4.9 VFD control operation ----24

5. OPERATOR INTERFACE PROGRAM DESCRIPTION. ----27
5.1 Parameters to read only ----28

5.2 Parameters to read & write----29

5.3 Alarm scanning----34

5.4 System coldstart. ----35

5.5 Alarm register----36

5.6 Display of the alarm register ----36

6. APPENDICES. ---- 37

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SYSTEM PARAMETERS' DEFAULT SETTINGS

FUNCTION KEY	PLC REGISTER	PARAMETER	INITIAL VALUE	NOTES
Write - F3	-	Language F - French E - English	E - English	
Write-PREV-F3	102	New password	9	
WRITE	24 526	# of pumps inPARAllel (in simultaneous operation) Flush hour	2 24H	2- parallel operation 1-one pump only 24H-Flush disable
WRITE	2	Start 1 delay	10 s	
WRITE	5	Start 2 delay	10 s	
WRITE	8	Blocking delay P1	15 s	
WRITE	11	Blocking delay P2	15 s	
WRITE	20	Alarm delay	5s	On Power up only
WRITE	132	M1/M2 closing delay	10s	
WRITE	590/592	Flowmeter scaling	0-80l/s	
WRITE	70/72	Min/Max Level scaling	0-320 cm	
WRITE	74	Start 1 level	100 cm	
WRITE	75	Start 2 level	120 cm	
WRITE	76	Stop 1 level	50 cm	
WRITE	77	Stop 2 level	50 cm	
WRITE	107 106	High level alarm Low level alarm	200 cm 0 cm	
WRITE	96	P1 max. current	50 A	
WRITE	98	P1 max. current	50 A	
WRITE	111 601	P1 high current alarm Delay	35 A 30s	
WRITE	112 604	P2 high current alarm Delay	35 A 30s	
WRITE	100 607	P1 low current alarm Delay	0 A 30s	
WRITE	101 610	P2 low current alarm Delay	0 A 30s	
WRITE ON/OFF	-	ALTERNATE Mode Choice	ON	ON OFF toggle P1lead/P2lead
`WRITE	94	M-zone Inferior Level	80cm	L280CAP only
`WRITE	95	M-zone superior Level	90cm	L280CAP only
WRITE	1060	M-zone AREA	0 m^2	Required for inflow calculation
WRITE	113/2033	1P Cnom/Cref	0 l/s	Cnom-required for inflow calculation
WRITE	115/2035	2p Cnom/Cref	0 l/s	Cnom- required for inflow calculation
WRITE	114	Capacity histeresis	0 l/s	L280CAP only
WRITE	1503/1505/1504/1506	Frequency:Min/Start/Max/D	30/36/60/09 Hz	L280VFD only

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PLC READ-ONLY DATA REGISTER READING

FUNCTION KEY of OPERATOR INTERFACE	PLC REGISTER	PARAMETER	READINGS 1	2	3	4	5	6	7
FUNCTION KEY	PLC REGISTER	PARAMETER							
READ	146, 143	Runtime P1 TOTAL							
READ	176, 173	Runtime P1 /DAY							
READ	155, 152	Runtime P2 TOTAL							
READ	185, 182	Runtime P2 /DAY							
READ	164, 161	Runtime P12 TOTAL							
READ	194, 191	Runtime P12 /DAY							
READ	217, 214	Overflow runtime							
READ	202	No. of starts P1							
READ	205	No. of starts P2							
READ	208	Hi level occurrences							
READ	220	Overflow occurrences							
READ	1503/1505/1504/ 1506	Freq:Min/Start/Max/D							L280VFD only
READ	1501/1502	SpeedP1/SpeedP2							
READ	596	Flowmeter reading							
READ	136/223	P1/P2 current							
READ	74 ,2	Start 1 Level & delay							
READ	75, 5	Start 2 Level & delay							
READ	76 77	Stop 1 Level Stop 2 Level							
READ	70, 72	Level Range							
READ	1400	Pumped volume total							
READ	1402	Pumped volume/day							
READ	1645	Dynamic inflow							
READ	1024	Cycle inflow							L280CAP only
READ	1300	P1Capacity calcul.							L280CAP only
READ	1302	P2Capacity calcul.							L280CAP only
READ	1308	2P Capacity calcul.							L280CAP only
Read than ALM	270	Alarm register							

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INTRODUCTION

The **LOGIMAC® 280VM P/N 13-50 90 90** was designed for the control and supervision of a sewage pumping station with one or two pumps.

The complete system consists of programmable logic controller **LOGIMAC® 280VM-PLC** as per the configuration specified in the following chapter, the operator interface **LOGIMAC® 280VM-OP** and the alarm annunciator **LOGIMAC® 280-AP.**

LOGIMAC® 280-PLC takes an analog level signal 4-20 mA from any of the level sensor with that kind of output.

The controller can be used in one of the three programmed mode which is set before shipping:

- **L280** as previous Logimac 280CIM
- **L280CAP** with pumps' capacities calculation
- **L280VFD** with VFD control following the level changes

Dynamic inflow & pumped volume can be calculated in any of modes.

1.1 Approvals

Sensor: CSA certified for operation in **Class I, Division 2, Groups C and D hazardous environments**.
(Note: For this approval to be valid special installation conditions apply).

1.2 Part numbers

LOGIMAC® 280VM-PLC (P/N 13-50 90 91
Analog I/O expansion unit (P/N 13-40 02 30)
LOGIMAC® 280-AP (P/N 13-50 90 19)
LOGIMAC® 280VM-OP (P/N 13-50 90 92)

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2. HARDWARE DESCRIPTION

2.1 LOGIMAC® 280-PLC CONFIGURATION

The programmable logic controller (PLC) is composed of the modules specified in the table 2.1 below depending on power supply module .

2.1 CONFIGURATION of **LOGIMAC® 280VM-PLC**

ITEM #	DESCRIPTION	TECHNICAL DATA
P/N 13-50 90 91	CPU & Memory	Flash user memory program memory: 9 Kwords storage memory: 2 Kwords operation speed: 1.0 ms/ 1Kword of logic user program: L280VM
	16 - inputs	24V DC; current consumption: 7.3mA max./point
	11 relays+1 DC -outputs	Operating voltage: 5-30 V DC 5-250 V AC max. load: 2A resistive/ 0.6A inductive
	Supply	120V AC (102 -132V), 60 Hz (47- 63 Hz) DC output power supply: 24V + -10%, 200 mA max. current
	Dimensions	(90H x 150W x76D) mm
	service temperature stocking temperature	0..+55°C -40..+85°C
	Port	Two serial ports:1: RS 232, 2: RS 485
	Removable terminal strip	included
P/N 13-40 02 30	Analogue Expansion unit 4-inputs/2-outputs	Inputs: current 4-20mA outputs: current 4-20mA Supply : 120V AC (102 -132V), 60 Hz (47- 63 Hz) Dimensions: 90H x 95W x76D) mm

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2.2 OPERATOR INTERFACE LOGIMAC® 280-OP

The operator interface LOGIMAC® 280-OP is is a fully programmable man-machine interface.
One part of a programming can be done using the software, specific for the unit, and another one should be programmed in the PLC program software for PLC ladder programming.

The operator interface is equipped of:

- 6 programmable function-key
- Alpha-numeric key-pad
- LCD screen 160x32 pixels (89.6x17.9mm display) for small graphic/80 total characters on 4 lines
- PLC communication port RS 232
- RS422/RS485 serial programming port
- cable: operator interface-PLC (DB9F- RG45)
- The supply voltage 24VDC
- Power consumption: Normal 0.1A @ 24VDC, Max 0.3A

FIG.1 Operator interface unit LOGIMAC 280VM-OP

The operator interface was fully programmed for this application (see description of this programming in chapter 5 of this manual).

For further details, please refer to the manufacturer user manual supplied with unit.

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2.3 ALARM ANNUNCIATOR LOGIMAC® 280-AP

2.3.1 TECHNICAL DATA :

Supply voltage: 24V DC
Current consuming: 80 mA.

2.3.2 COMPONENTS and THEIR FUNCTIONS:

The annunciator is composed of four (4) integrates parts:

- Printed circuit board (P/N 13-50 90 59)
- Face plate with descriptions (P/N 13-51 15 34)
- Board connector with terminal (P/N13-42 00 03)
- Flat cable (P/N 13-41 00 15)

The printed circuit board represent the circuit as per drawing 2603-A2 (see appendices 1). The circuit contains:

- 13 diodes LED (D1..D13),
- 2 push buttons (SW1et SW2),
- 13 resistors (R1..R13) to limit the current and
- 26 auxiliary diodes of type 1N4004 (D14.. 39).

Each parallel circuit (total 16 circuits) is connected to one pin (1-16) of the (P1) plug for the flat cable .

The functions of circuit are :

Indication:

The positive (+) signal of 24V DC power supply connected to terminal 2 is common for all diodes LED. To turn on the diode LED, the negative (-) signal should be connected to another end of circuit. It can be done if the PLC output relay contact, connected to the specific LED circuit closes ***(All PLC outputs connected to annunciator should have the common terminal COM connected to negative (-) terminal of source).***

Lamp test:

The negative (-) signal of 24V DC power supply connected to terminal 1 is used to test LED diodes. Pushing the push button SW1, connects 24V DC power supply to all LED diode circuits and turn all LED's on.

Acknowledge/Reset:

By pressing the push button SW2, the positive (+) signal of 24V DC power supply will be connected to PLC input being connected to terminal 4 of the annunciator.
This input signal is programmed in PLC as *acknowledge* signal (first appearance) and as *reset* signal (second appearance).
It is important to connect the common terminal COM of this PLC input to negative (-) terminal of source.

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Faceplate is a two-side lamicoid plate with descriptions in English on one side, and in French on another. The descriptions are as per drawing C-51 15 34
(See appendices 1).

Board connector with terminal is composed of 16 screw-terminals connected to a 16-pin male plug (P2) for flat cable.

The flat cable is a 2-meters length flat cable with one female-plug on each end, which can be plug in:

- the P1 plug (on printed circuit board) and
- the P2 plug (on board connector with terminals).

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3. LOGIMAC® 280-PLC INPUT & OUTPUT CONNECTION

LOGIMAC® 280-PLC has 16 digital inputs, 11 digital relay-based outputs, 1 transistor digital output (high speed) d 4 analog 4-20 mA inputs & 2 analog outputs. For this application the inputs and outputs are assigned to the signals specified in the table 1, 2, 3 and 4 respectively.

TABLE 1.: DIGITAL INPUT ASSIGNATION

INPUT	DESCRIPTION	NOTES
1	ACKNOWLEDGE/ RESET	signal provided by push button "ACKNOWLEDGE/ RESET on the alarm annunciator
2	P1 AUTO	P1 mode selector in AUTO position
3	P2 AUTO	P2 mode selector in AUTO position
4	GEN SET RUN	GEN SET RUN NO contact. If closed , one pump only is allowed to run (no parallel operation of two pumps)
5	OL1(B1)	contact indicating overcurrent of the P1 pump (breaker auxiliary contact)
6	R6 leakage. P1	interface relay contact from Mini CAS II unit indicating a water leakage in P1 pump
7	R5 high temp. P1	interface relay contact from Mini CAS II unit indicating a high temperature in P1 pump
8	OL2(B2)	contact indicating overcurrent of the P2 pump (breaker auxiliary contact)
9	R8 leakage P2	interface relay contact from Mini CAS II unit indicating a water leakage in P2 pump
10	R7 high temp.P2	interface relay contact from Mini CAS II unit indicating a high temperature in P2 pump
11	FLH or ISRH high level	contact indicating the high level reached (follows FLH float NO contact)
12	Overflow (optional)	contact indicating the overflow level reached.(FLOV float NO contact)
13	FLL or ISRL low level	contact indicating the low level reached (follows FLL float NC contact)
14	PFD	voltage or phase failure detection (PFD)
15	M1 contactor closed	auxiliary contact of the M1 contactor to indicate the contactor status
16	M2 contactor closed	auxiliary contact of the M2 contactor to indicate the contactor status

For wiring details see drawing E-97786: LOGIMAC 280VM I/O connection

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TABLE 2.: DIGITAL OUTPUT ASSIGNATION

OUTPUT	DESCRIPTION	NOTES
1	spare	24V DC output
2	M1 closing signal	order to close the M1 contactor (interface relay R1)
3	M2 closing signal	order to close the M2 contactor (interface relay R2)
4	**COMMON** alarm	Common alarm signal for remote transmission (interface relay R14)
5	High level alarm	HIGH LEVEL alarm signal (120V AC circuit)
6	Low level alarm	LOW LEVEL alarm signal to the alarm annunciator
7	P1 OVERLOAD alarm /M1 closing fault	P1 OVERLOAD alarm signal to the alarm annunciator (this output is also activated if M1 contactor does not close its contact during ten (10) seconds following the order to close - R1 relay contact closing)
8	P2 OVERLOAD alarm /M2 closing fault	P2 OVERLOAD alarm signal to the alarm annunciator (this output is also activated if M2 contactor does not close its contact during ten (10) seconds following the order to close - R2 relay contact closing
9	P1 leakage alarm	P1 LEAK. alarm signal to the alarm annunciator
10	P2 leakage alarm	P2 LEAK. alarm signal to the alarm annunciator
11	P1 high temp. alarm	P1TEMP alarm signal to the alarm annunciator
12	P2 high temp. alarm	P2 TEMP alarm signal to the alarm annunciator

For wiring details see drawing E-97786: LOGIMAC 280VM I/O connection

TABLE 3 ANALOG INPUT ASSIGNATION

INPUT	DESCRIPTION	Notes
1	Level signal	Level signal from an ultrasonic sensor. Use the operator interface for scaling
2	P1 current signal (optional)	P1 pump current signal from current transducer. Use the operator interface for scaling
3	P2 current signal (optional)	P2 pump current signal from current transducer. Use the operator interface for scaling
4	Flowmeter	Signal of flow from Flowmeter (4-20mA)

For wiring details see drawing E-97786: LOGIMAC 280VM I/O connection

TABLE 4 ANALOG OUTPUT ASSIGNATION

OUTPUT	DESCRIPTION	Notes
1	P1 VFD signal	4-20 mA signal to control VFD (P1) following level changes
2	P2 VFD signal	4-20 mA signal to control VFD (P2) following level changes

For wiring details see drawing E-97786: LOGIMAC 280VM I/O connection

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4. PLC PROGRAM DESCRIPTION

4.1 INITIAL PARAMETERS WRITING

During the first scan or coldstart of the program the initial default parameters are automatically written to the assigned memory registers. TABLE 4 presents the list of the parameters and their default values.

An operator can read or change (write) these parameters using operator interface function keys listed in the first column of the table (see 5.2 chapter for details).

TABLE 4: SYSTEM PARAMETERS' DEFAULT SETTINGS

FUNCTION KEY	PLC REGISTER	PARAMETER	INITIAL VALUE	NOTES
Write - F3	-	Language F - French E - English	E - English	
Write-PREV-F3	102	New password	9	
WRITE	24 526	# of pumps inPARAllel (in simultaneous operation) Flush hour	2 24H	2- parallel operation 1-one pump only 24H-Flush disable
WRITE	2	Start 1 delay	10 s	
WRITE	5	Start 2 delay	10 s	
WRITE	8	Blocking delay P1	15 s	
WRITE	11	Blocking delay P2	15 s	
WRITE	20	Alarm delay	5s	On Power up only
WRITE	132	M1/M2 closing delay	10s	
WRITE	590/592	Flowmeter scaling	0-80l/s	
WRITE	70/72	Min/Max Level scaling	0-320 cm	
WRITE	74	Start 1 level	100 cm	
WRITE	75	Start 2 level	120 cm	
WRITE	76	Stop 1 level	50 cm	
WRITE	77	Stop 2 level	50 cm	
WRITE	107 106	High level alarm Low level alarm	200 cm 0 cm	
WRITE	96	P1 max. current	50 A	
WRITE	98	P1 max. current	50 A	
WRITE	111 601	P1 high current alarm Delay	35 A 30s	
WRITE	112 604	P2 high current alarm Delay	35 A 30s	
WRITE	100 607	P1 low current alarm Delay	0 A 30s	
WRITE	101 610	P2 low current alarm Delay	0 A 30s	
WRITE ON/OFF	-	ALTERNATE Mode Choice	ON	ON OFF toggle P1lead/P2lead
`WRITE	94	M-zone Inferior Level	80cm	L280CAP only
`WRITE	95	M-zone superior Level	90cm	L280CAP only
WRITE	1060	M-zone AREA	0 m^2	Required for inflow calculation
WRITE	113/2033	1P Cnom/Cref	0 l/s	Cnom-required for inflow calculation
WRITE	115/2035	2p Cnom/Cref	0 l/s	Cnom- required for inflow calculation
WRITE	114	Capacity histeresis	0 l/s	L280CAP only
WRITE	1503/1505/1504/1506	Frequency:Min/Start/Max/D	30/36/60/09 Hz	L280VFD only

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4.2 ANALOG INPUT/OUTPUT READING & SCALING

All analog inputs are based on 12-bit analog-digital converter. During each scan of program 12 bits are converted in 16-bit analog data word %AI. Factory scaling for analog inputs of 4-20 mA and the corresponding level and the pump current scaling for the default ranges is provided on fig.2 and 3.

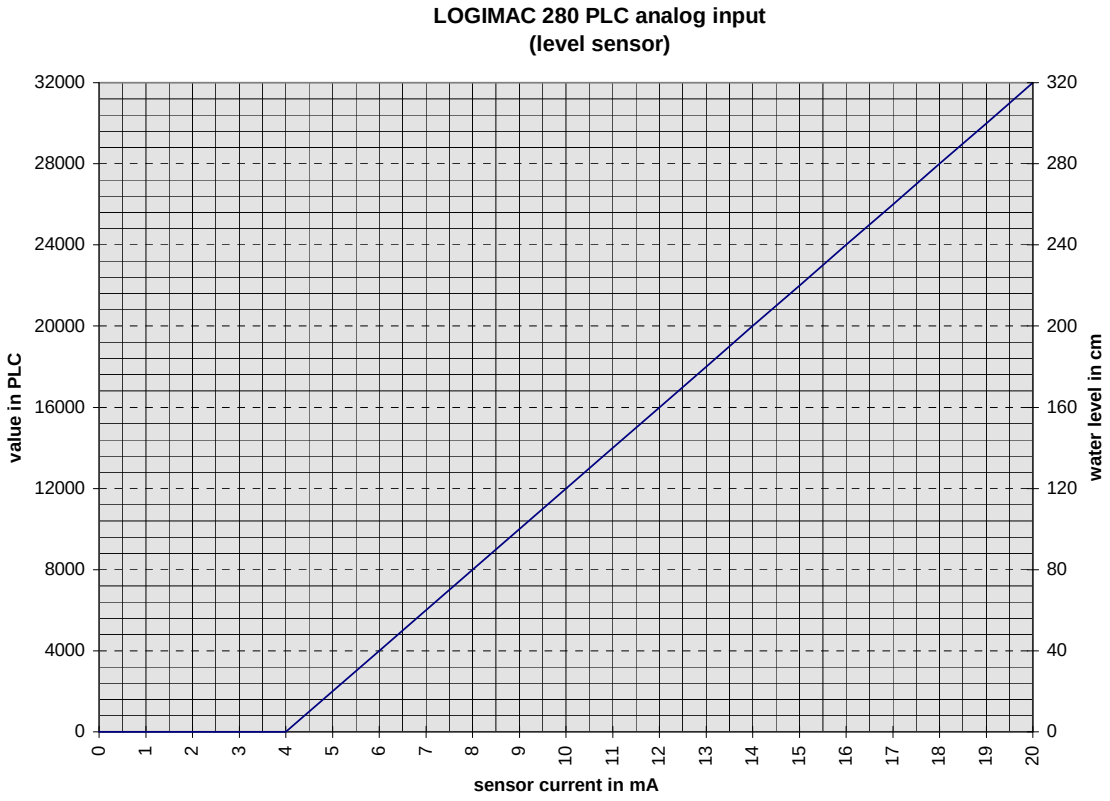

FIG. 2 ANALOG INPUT SCALING (LEVEL)

The scaling will be automatically changed by PLC if an operator provides different values of ranges using the operator interface.

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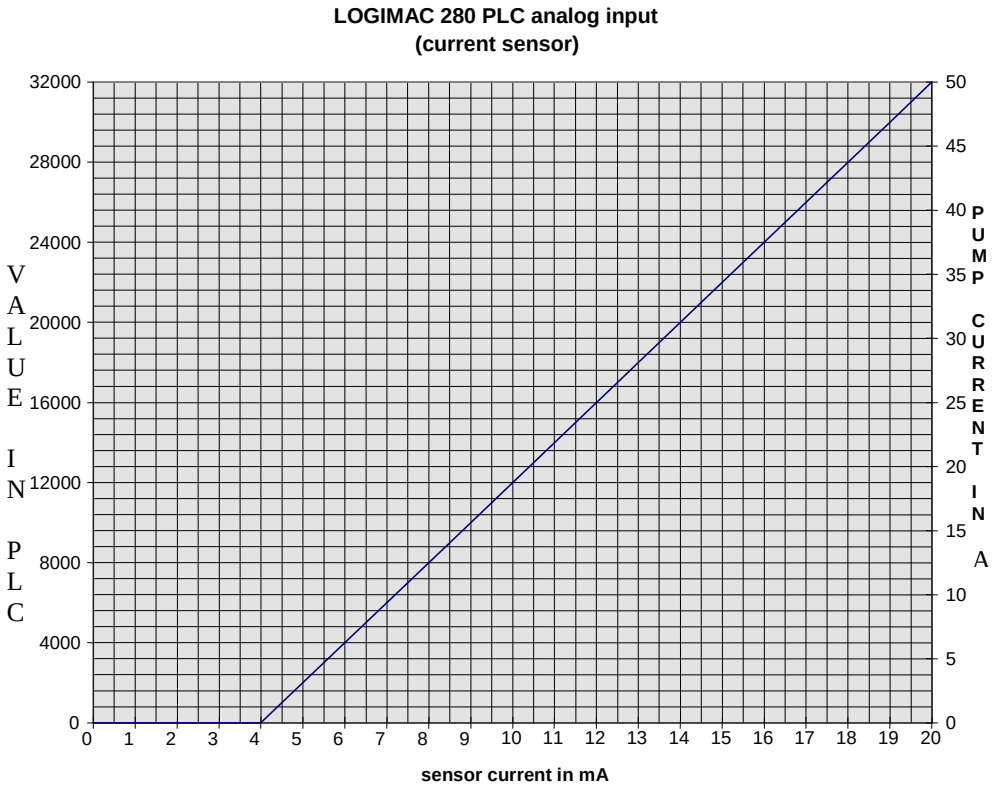

FIG.3

ANALOG INPUT SCALING (CURRENT)

If the inputs of pumps' currents are not used, no changes are required in default values of ranges. The PLC will treat these inputs as a zero signal.

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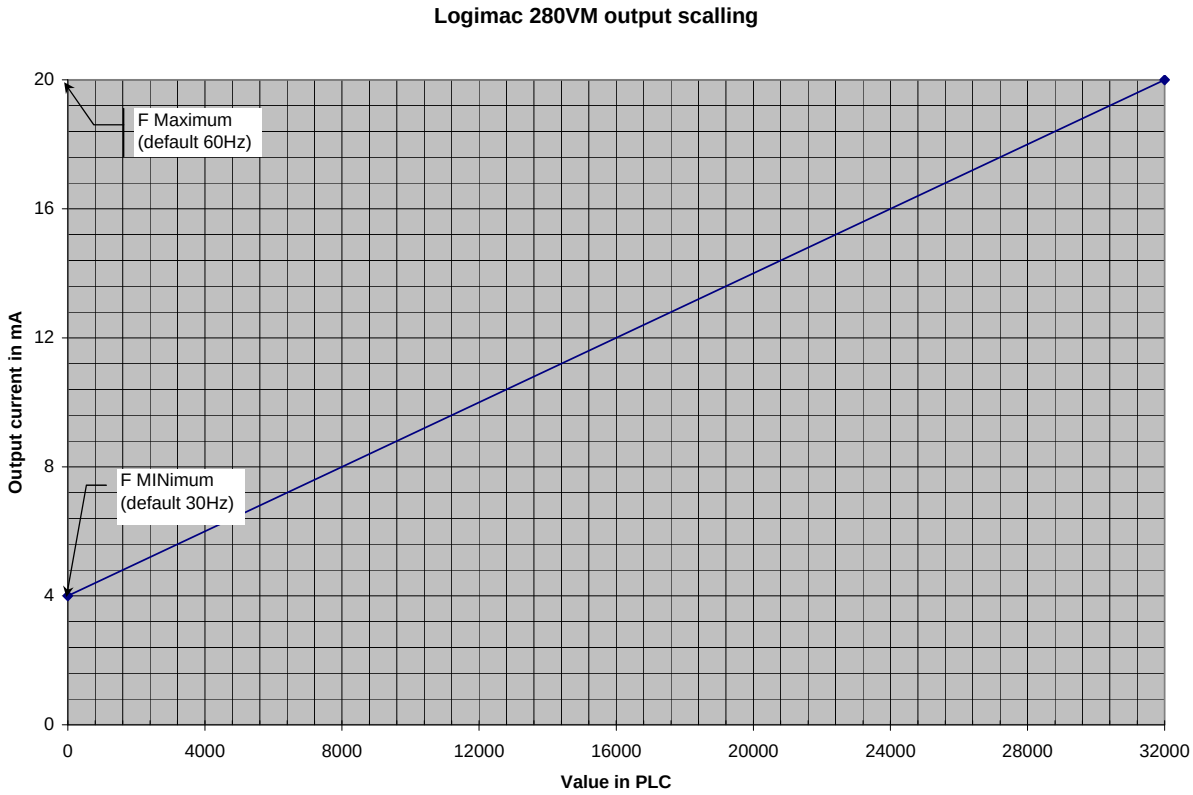

Applicable for controls using the Logimac280VFD only

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4.3 STARTING PUMP CHOICE

The control system allows the operation of either one or two pumps in parallel but prevents simultaneous start of two pumps.

In automatic mode a choice of the pump to start is done by the PLC program following the conditions specified below:

P1 PUMP is chosen to start as a **duty pump** if :

- The start conditions are reached (water level is higher than START 1 or high level float is active) and
- P1 pump is operational (no faults) and
- the alternate mode is not chosen or P2 pump is faulty, or
- the alternate mode is chosen but P2 pump operation had been memorized or P1 operation had not been memorizing

P2 PUMP is chosen to start as a **duty pump** if :

- The start conditions are reached (water level is higher than START 1 or high level float is active) and
- P2 pump is operational (no faults), and
- the P1 pump is faulty, or
- the alternate mode is chosen and the P1 cycle of operation had been memorized,

P1 PUMP is chosen to start as a **standby pump** if :

- The parallel operation conditions are reached (water level is higher than START 2 level or high level float is active) and
- P1 pump is operational (no faults), and
- M2 contactor is closed

P2 PUMP is chosen to start as a **standby pump** if :

- The parallel operation conditions are reached (water level is higher than START 2 level or high level float is active) and
- P2 pump is operational (no faults) , and
- M1 contactor is closed

To start the pump, either the start conditions or parallel conditions should be kept during at least **10-second** period calling ***START DELAY.*** The default value of 10 seconds can be changed by operator (see *TIME DELAY CHANGE* in chapter 5.2)

If one of pumps is stopped (for whatever reason) the BLOCKING DELAY will be activated. Neither the pump P1 or P2 can start during this period (two pumps will be prevented to start). If two pumps are running and one of them stops this delay will not have effect on running pump.
The default value of the BLOCKING DELAY are 15 s and can be adjusted by operator using operator interface for each pump separately (see *TIME DELAY CHANGE* in chapter 5.2).

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4.4 CONTACTOR OPERATION

In automatic mode the M1 contactor (or the M2 contactor) will close following the closing signal from R1 (or R2) interface relay after ***START DELAY*** as specified in previous chapter.
Reception of the contactor closing confirmation by PLC will be indicated by turning on the respective diode LED labeled **RUN P1** or **RUN P2** on the alarm annunciator (see appendices 1 for annunciator details).

NOTE: ***Closing fault***: If PLC does not receive a confirmation of the contactor closing (see M1 or M2 contact as PLC inputs) during the 10-second period following the closing order (R1 or R2 relay contact closing), the closing order will be removed and the alarm will be signaled.

In automatic mode, if stop conditions are reached, the running pump contactor will open. If two pumps are running, M1 contactor opens first (on STOP 1) and M2 contactor follows (on STOP2).

Each contactor can be open or closed manually, using a mode selector MAN-OFF-AUTO (MAN**-OFF** positions).

Either during manual or automatic operation the contactor opens automatically on fault conditions of the respective pump.

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4.5 ALARMS : Memorizing, indication, acknowledge, reset.

4.5.1 P1 or P2 pump OVERLOAD / M1 or M2 contactor CLOSING FAULT

On the overload fault, the respective pump breaker opens. Auxiliary contacts of breakers are used as the overload signal for PLC inputs (OL1or B1, OL2 or B2).
If one of contacts is closed (OL1 or OL2), the corresponding contactor closing signal will be removed (see R1 or R2 relay) and the OVERLOAD alarm will be memorized in PLC memory and be indicated by the flashing LED diode (**OVERLOAD P1** or **OVERLOAD P2)** on the alarm annunciator.

The LED diodes **OVERLOAD P1** or **OVERLOAD P2** turn on also in the case of ***Closing fault*** of the M1 or M2 contactor (see NOTE in previous chapter). A distinction between OVERLOAD and CONTACTOR CLOSING FAULT can be seen on the operator interface message.

This alarm will be held, even if the fault conditions disappear. The contactor of the pump in fault will open automatically and cannot be closed without an operator intervention.

Reset the circuit after the fault correction: push the RESET push-button once for **acknowledge** (LED stops flashing), and twice for **reset.**

4.5.2. ALARM: WATER LEAKAGE OF P1/ P2 PUMP

The faults detection will be done by the sensors attached to Mini CAS II units of ITT Flygt. The interface relay of this unit (**R6** or **R8**) operates if water is detected in the corresponding pump. The contact of this relay is connected to PLC input to provide the information.

If one of these contacts is closed, the corresponding contactor closing signal will be removed (see R1 or R2 relay) and the alarm LEAKAGE will be memorized in PLC memory and be indicated by the flashing LED diode (**LEAK. P1** or **LEAK. P2**) on the alarm annunciator.

This alarm will be held, even if the fault conditions disappear. The contactor of the pump in fault will open automatically and cannot be closed without an operator intervention.

Reset the circuit after the fault correction: push the RESET push-button once for **acknowledge** (LED stops flashing), and twice for **reset.**

4.5.3. ALARM: HIGH TEMPERATURE OF P1/ P2 PUMP

The faults detection will be done by the sensors attached to Mini CAS II units of Flygt. The interface relay of this unit (**R5** or **R7**) operates if a temperature of pump goes higher than sensor adjustment in the corresponding pump. The contact of this relay is connected to PLC input to supply the information.

If one of these contacts is closed, the corresponding contactor closing signal will be removed (see R1 or R2 relay) and the alarm HIGH TEMPERATURE will be memorized in PLC memory and will be indicated by flashing LED diode (**TEMP P1** or **TEMP P2**) on the alarm annunciator.

This alarm will be held, even if the fault conditions disappear. The contactor of the pump in fault will open automatically and cannot be closed without an operator intervention.

Reset the circuit after the fault correction: push the RESET push-button once for **acknowledge** (LED stops flashing), and twice for **reset.**

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4.5.4. ALARM: HIGH WATER LEVEL

The fault detection is done by FLH float or by analog level sensor (version 1.4 or later).
When float is tilted its normally open contact (NO) (or ISRH interface relay) closes. That contact is connected to the PLC input 11.
If this contact is closed, a HIGH LEVEL alarm will be indicated by the LED diode (**HIGH LEVEL**) on the alarm annunciator. This alarm will disappear from annunciator if fault conditions disappear.
The **High level** alarm is also activated when the level reaches the High level value adjusted using operator interface.
In both cases R14 relay will operate (its NO contact is available for a remote transmission of the **ALARM** signal). The common alarm will stay even if fault condition disappears. Reset the circuit after the fault correction: push the RESET push-button twice for **reset**
The **output 5** gives a **High Leve**l signal. This output is energized on High Level float tilted. This output can be used to connect the interposing relay (with 120V AC coil) if a dry contact is needed for remote High Level alarm indication.

4.5.5. ALARM: LOW LEVEL

The faults detection is done by FLL float or by analog level sensor (version 1.4 or later).
The normally closed contact of the float (or normally open contact (NO) of ISRL interface relay) is connected to the PLC input.
If this contact is closed, a LOW water LEVEL alarm will be memorized in PLC memory and will be indicated by the flashing LED diode (**LOW LEVEL**) on the alarm annunciator.
This alarm will be registered and indicated on the annunciator even if fault conditions disappear.
The **Low level** alarm is also activated when the level reaches the Low level value adjusted using operator interface.
In both cases R14 relay will operate (its NO contact is available for a remote transmission of the **ALARM** signal). The common alarm will stay even if fault condition disappears. Reset the circuit after the fault correction: push the RESET push-button twice for **reset.**

The contactors of the pumps will open automatically but can be closed if fault conditions disappear.
Reset the circuit after the fault correction: push the RESET push-button once for **acknowledge** (LED stops flashing), and twice for **reset** .

4.5.6. ALARM: POWER FAILURE

The faults detection will be done by the power failure detector (PFD) connected to three phases of the power entrance. The PFD operates on phase or power failure. Its NC contact is open if three phases are present and voltage value is between adjusted limits. On fault this contact will close.

If this contact is closed, the contactor closing signals will be removed (see R1 and R2 relays) and the alarm POWER FAILURE will be indicated by the LED diode (**POWER FAILURE**) on the alarm annunciator.

This alarm will disappear if fault conditions disappear.
On fault the contactors will open automatically but can be closed following start sequence if the utility power is back to normal.

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4.5.7. ALARM: P1/P2 PUMP LOW CURRENT

If the pump current analog inputs are used these alarms can be available. The limit values for these alarms can be provided by an operator using the operator interface (see chapter 5.2 for details). The default values are established as zero (0) Amps. An operator can change these values for the LOWEST POSSIBLE CURRENT established during pump's running test.

If the pump current value is lower than established lowest value for respective pump, LOW CURRENT OF P1 (or P2) PUMP alarm will be registered in PLC memory. The 30-seconde delay (by default) prevents the activation of the alarm during transient conditions. This alarm will be indicated on operator interface display (see chapter 5.3 "Alarm scanning" for details).

This alarm will be held, even if the fault conditions disappear. The contactor of the pump in fault will open automatically and cannot be closed without an operator intervention.

Reset the circuit after the fault correction: push the RESET push-button once for **acknowledge**, and twice for **reset.**

4.5.8. ALARM: P1/P2 PUMP HIGH CURRENT

If pump current analog inputs are used these alarms can be available. The limit values for these alarms can be provided by an operator using the operator interface (see chapter 5.2 for details). The default values are established on 350 Amps. An operator can change these values for the HIGHEST POSSIBLE CURRENT established during pump's running test.

If the pump current value I1 (or I2) is higher than established highest value for respective pump, the HIGH CURRENT OF P1 (or P2) PUMP alarm will be registered in PLC memory. The 30-seconde delay (by default) prevents the activation of the alarm during transient conditions. This alarm will be indicated on the operator interface display (see chapter 5.3 Alarm scanning for details).

This alarm will be held, even if fault conditions disappear. The contactor of the pump in fault will open automatically and cannot be closed without an operator intervention.

Reset the circuit after the fault correction: push the RESET push-button once for **acknowledge**, and twice for **reset.**

4.5.9. COMMON ALARM

All alarms described above will activate the COMMON ALARM OUTPUT with **R14** interface relay. The contacts of this relay are available to remote control or indication.

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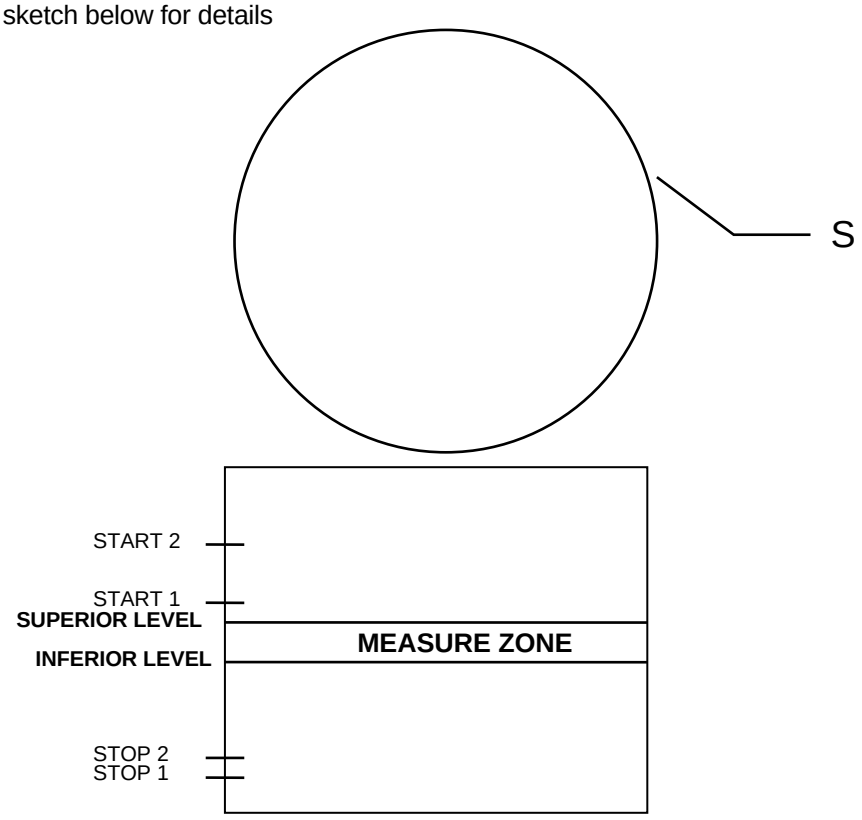
4.6 FLUSHING ONCE A DAY SEQUENCE

The special sequence is programmed to do a flushing of a piping system once a day. It can be used either for a system designed for an operation of one pump only at the time (setting of # of pumps in PARAllel: 1) or for the system where two pumps are allowed in parallel operation (setting of # of pumps in PARAllel: 2).
The hour of flushing can be adjusted on the operator interface (see first screen under function key F2 **write**). The default value is 24h, which made this function disable.
Operator should set the hour of flushing (0 - 23h). If this hour is reached a START 1 level set value will be ignored. Two pumps will start if level START 2 is reached. As usual the start delay is applied between pump starts to prevent simultaneously start of two pumps. Two pumps will stop on STOP level. Once the flushing cycle finished the system return to the normal sequence.

4.7 PUMP CAPACITY CALCULATION (For L280CAP only)

The PLC is programmed to calculate the pump capacity using so-called Jacuzzi Jaeger method. The method requires a MEASURE ZONE (a volume bounded by two sump levels: **inferior level** and **superior level)** to be defined. The MEASURE ZONE should be chosen between last STOP level and first START.
In addition to these levels, the MEASURE ZONE section **area** (S) should be also defined. The default parameters are shown in the table 7 (next chapter). These two levels and area can be changed using the operator's interface (see next chapter for details). It is very important to input the data as precise as possible.
NOTE: If a section area of measure zone changes within the zone, recalculate the equivalent section for uniform zone based on constant zone volume.
See the sketch below for details



Pump capacity calculation is based on the average CYCLE INFLOW and on the time needed to pump the defined previously volume of the MEASURE ZONE out. The cycle inflow is measured and calculated for each pumping cycle during the rising liquid level in MEASURE ZONE.

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In addition the value of the DYNAMIC INFLOW is calculated every second by PLC. The dynamic inflow can be read on the operator interface screen. It can be considered as instantaneous value of the inflow.

NOTE: The Dynamic Inflow can be calculated also without the option of Pump Capacity Calculation (L280CAP) if the values of rated capacity & sump section area are inputted.

During each pumping cycle one of the following pump capacities will be calculated by PLC:

- P1 capacity (if only P1 pump pumps out all volume of the measure zone)
- P2 capacity (if only P2 pump pumps out all volume of the measure zone)
- 2P capacity (two pumps capacity - if two pumps pump out all volume of the measure zone)

The calculation results of the CYCLE INFLOW and PUMP'S CAPACITIES can be read on the operator's interface screen (see next chapter for details) and can be printed on the system printer for each pumping cycle (see printing option for details).
SYSTEME CALIBRATION
For proper operation the system should be properly calibrated.
The calibration consists to choose the initial values of pump capacity used by the system as reference values.
To make it done automatically proceed as follow:

- choose the period of the day with low inflow to have only one pump in operation at the time
- choose INFERIOR & SUPERIOR level of the MEASURE ZONE
- measure the area of the section of the MEASURE ZONE
- Enter all the parameters using operator interface : INFERIOR & SUPERIOR level in cm (format xxx.x) AREA in square meters (format xx.xx)
- Pump the station to a level below the measure zone
- Enter the rated value of the pump capacity (if this value is not available, enter the random value different from that one you see on the operator interface screen)
- Put the pump functioning mode selectors in AUTO position
- wait to the end of pumping cycle; the entered previously RATED CAPACITY 1P **Cnom** will be completed by the real value of measured system REFERENCE CAPACITY **Cref**.
- If the values **Cnom** and **Cref**. differ more than 10% , repeat the last 4 steps by entering calculated **Cref** as **Cnom**.
- **To calibrate 2 pumps capacity calculation**: pump the station to a level below the measure zone and wait until the level increases to Start 1
- after the first pump starts, put the second pump in operation manually (pump Man-Off-Auto selector in Man position)
- Wait to the end of the pumping cycle (until the first pump stops) and than return the second pump to the automatic operation.
- The system is now calibrated: The values of **1P Cref** and **2P Cref** are used as reference values to determine the lowest and highest limits of a pump calculated capacities.

It is recommended to do this calibration once a year to keep the system calculation error within the lowest values possible.

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4.8 PUMPED VOLUME CALCULATION

For L280

A pumped volume is calculated continuously using the rated values of pump capacities (if they are inputted by operator) during the operation time. It is added continuously to the value of the pumped volume per day. Each day, at midnight, the daily pumped volume is added to the total pumped volume and the value of the daily pumped volume is set to zero (0). At any time, the pumped volumes (total and daily) can be read on the operator's interface (see next chapter for details)

For L280VFD mode unable

A pumped volume is calculated continuously using the rated values of pump capacities (if they are inputted by operator) during the operation time. The rated pump capacity is multiplied by the ratio of the actual pump speed to the rated speed (60Hz). The value of the pumped volume is added continuously to the value of the pumped volume per day. Each day, at midnight, the daily pumped volume is added to the total pumped volume and the value of the daily pumped volume is set to zero (0). At any time, the pumped volumes (total and daily) can be read on the operator's interface (see next chapter for details)

For L280CAP mode unable

A pumped volume is calculated using the recent, cycle calculated values of pump capacities and the operation time in each pumping cycle. It is calculated at the end of each cycle and the calculated value is added to the value of the pumped volume per day. Each day, at midnight, the daily pumped volume is added to the total pumped volume and the value of the daily pumped volume is set to zero (0). At any time, the pumped volumes (total and daily) can be read on the operator's interface (see next chapter for details)

At start up of the new station, default values are used to calculate a pumped volume. These default values are based on the value of the RATED CAPACITY. The RATED CAPACITY default value=0 so this calculation is disable . To do the calibration & unable the calculation, an operator should input at least a rated capacity of one pump **1P Cnom** > 0 (see next chapter for details).

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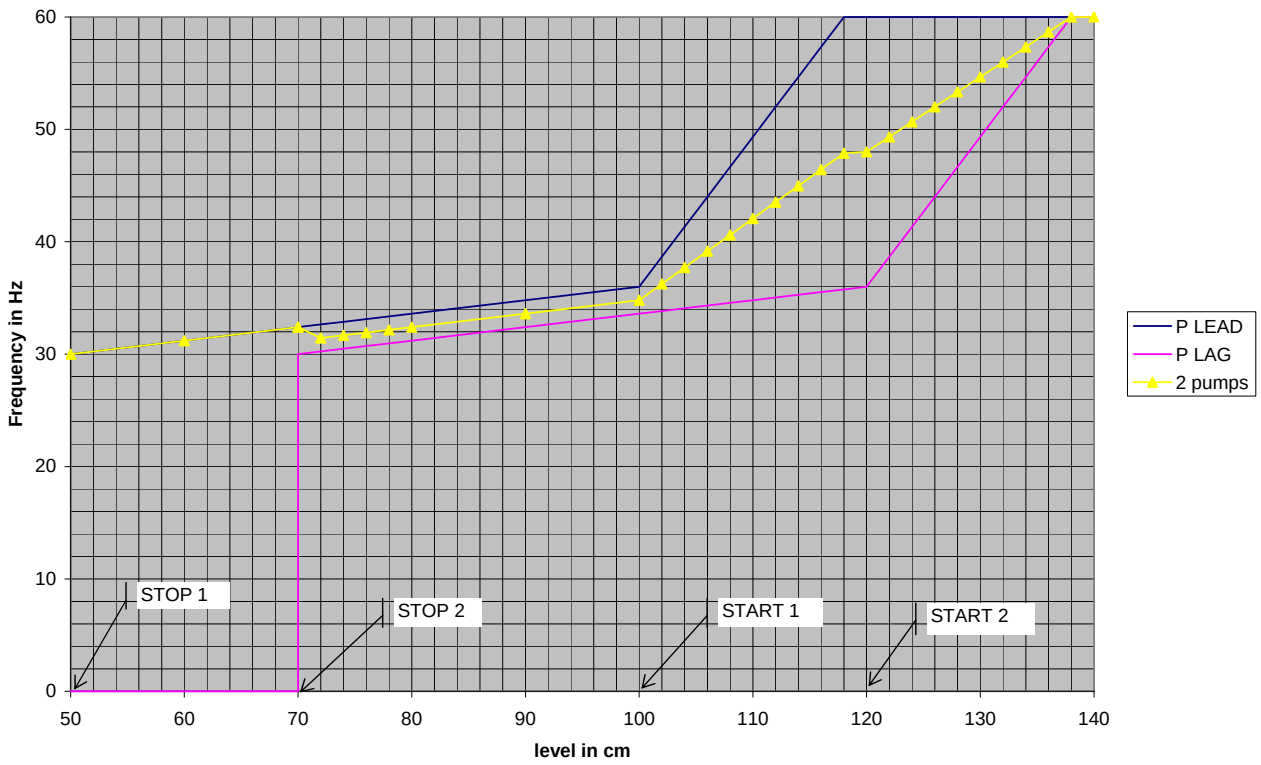
4.9 VFD CONTROL OPERATION **L280VFD** option

For the projects with a **V**ariable **F**requency **D**rive (VFD) when the pump speed has to be control following the level changes, the **L280VFD** option can be unable.
Once this option unable Logimac 280 will be able to give 4-20 mA signals to control pumps' VFDs.
See the figure below for parameters required to operate this control.



The required parameters are:

- **F min** (Minimum Frequency) – has to the same as set in VFD. It corresponds to 4 mA VFD speed input signal.
- **F start** (Frequency at start level)
- **F max** (maximum Frequency – usually 60Hz) – has to be the same as set in VFD. It corresponds to 20mA VFD speed input signal
- **Dfactor** (the ratio of START 2 - START1) saying how fast the maximum frequency has to be reach (range 0.1—1.0)

(example **Dfactor** = 0.9 means that the leading pump maximum frequency will be reached at the level 118cm as a result of START1+ **Dfactor** *(START 2- START 1)

All this parameters are adjustable by operator using operator interface.
Note: The minimum speed **Fmin** should not be lower than 30Hz.

Control functioning:
If START 1 level (100cm) is reached the leading pump will start with the speed corresponding to **Fstart (36Hz).**
If the level decreases with pumping the pump speed will decrease until **Fmin** at STOP 1 level. In that point the pump stops.
If the level increases with leading pump functioning , its speed will increase linearly up to **Fmax** (60Hz) reached at the level = START 1 + Dfactor *(START2 – START1) = 100+ 0.9*(120-100)=118cm

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Once this level reaches the leading pumps will be running at rated speed.

If the level still increases and reaches the START 2 level, the lagging pump will start. The speed pattern of the lagging pump is the same as the leading pump so theoretically the lagging pump speed will be **Fstart** (36Hz) but the system recalculates the both values to have the same speed for both pumps keeping the same total capacity. So the speed of 2 pumps working together will be:
(SPEED lead+ SPEED lag)/2 = (60+36)/2=48 Hz.
If the level still increase the lag pump theoretical speed (SPEED lag) will increase linearly up to **Fmax** (60Hz) reached at level = START 2 + Dfactor *(START2 – START1) = 120+ 0.9*(120-100)=138cm.
The system will recalculate the same speed for both pumps (SPEED lead+ SPEED lag)/2.
The same pattern will be follow if the level decreases down to STOP 2 level when the lag pump will stop.
After the lag pump stops and the level still deceases the lead pump speed will decrease linearly until **Fmin** at STOP 1 level when the pump stop.
NOTE:If high level alarm is reached the pumps speed will run with full speed corresponding to Fmax adjusted (usually 60Hz)

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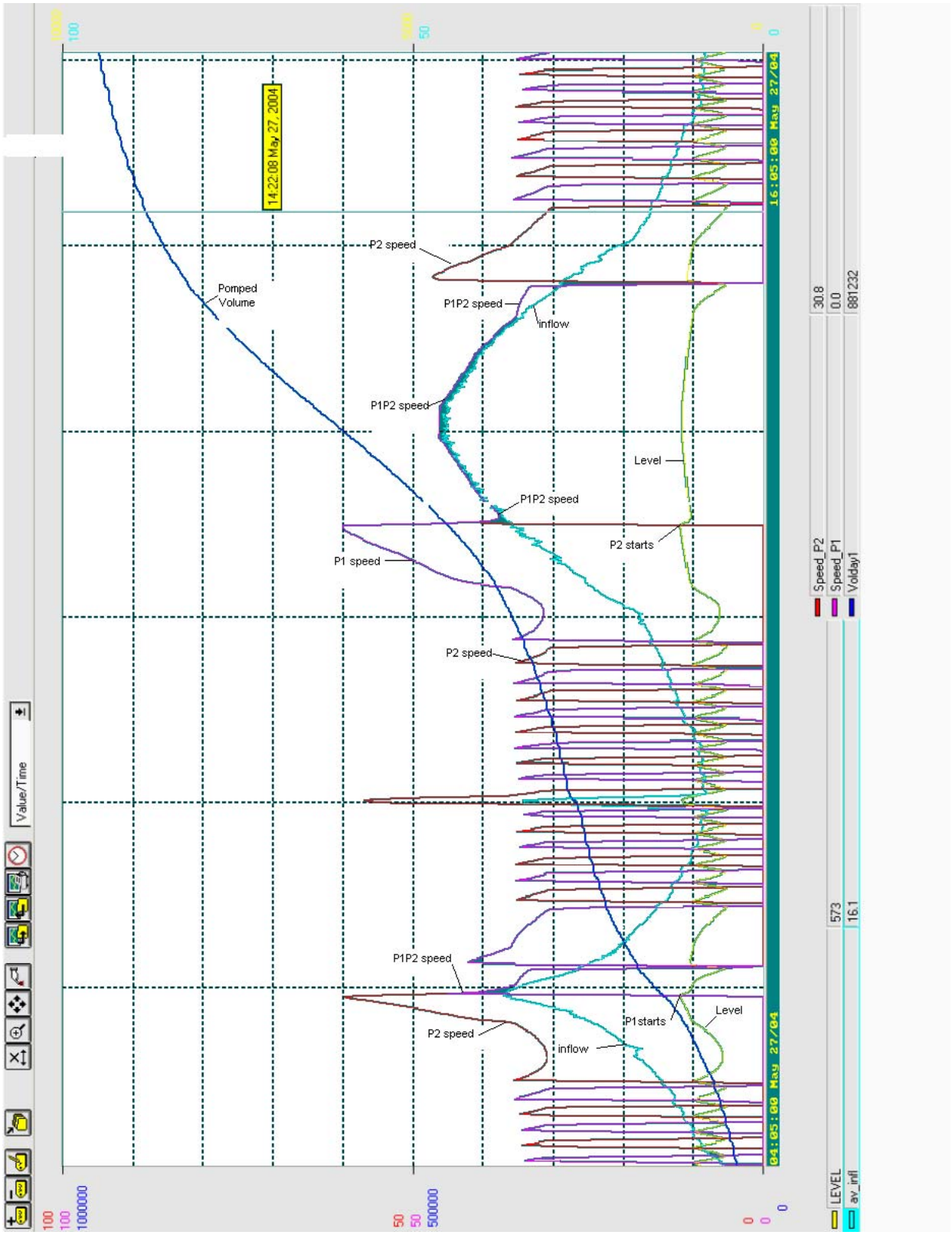

Exemple of Trend of VFD duplex pump control . Pumps capacity 35l/s; START1=100c; START2-120cm; Inflow varies from 5-46l/s

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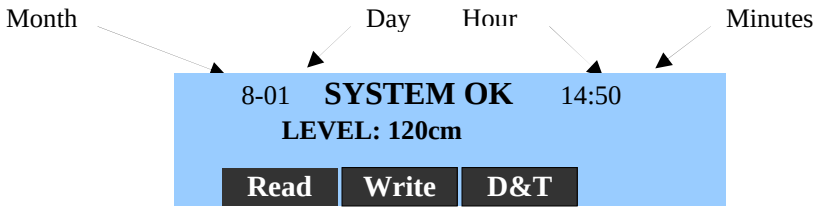
5. OPERATOR INTERFACE PROGRAM DESCRIPTION

Using the operator interface, an operator can :

- read or change PLC current date & time
- read the parameters and data stored in the PLC data registers
- read the alarm register
- write the system operating parameters
- monitor the alarms
- reset all parameters to their default values (cold start)

If no alarm is active the following screen is displayed on the operator interface display:



This is the default screen

The date (month - day) and the time (hour : minutes) stored in the CPU of PLC are displayed on the operator interface default screen.

If these values do not correspond with reality, the operator can change it using operator interface key pad.

To change one of the displayed values (*month, day, hour, minutes*) an operator should :

- Push **D&T** function-key
- Screen change to

- Use ⇨⇦ arrow-keys to place the cursor on a value to change (coursor flashes on the value),
- Type the new value
- Push **ENTER**
- Push **D&T** to **confirm**
- Screen **return** to **default**

Repeat the procedure for each value to change

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5.1 PARAMETERS TO READ ONLY

If no alarm is active, an operator can read the data stored in the specific data memory register by consecutively pushing **Read** function key.
Parameters to read are given in the table 5 below:

TABLE 5. PLC DATA REGISTER READING

FUNCTION KEY	PLC REGISTER	PARAMETER	
READ	146, 143	Runtime P1 TOTAL	
READ	176, 173	Runtime P1 /DAY	
READ	155, 152	Runtime P2 TOTAL	
READ	185, 182	Runtime P2 /DAY	
READ	164, 161	Runtime P12 TOTAL	
READ	194, 191	Runtime P12 /DAY	
READ	217, 214	Overflow runtime	
READ	202	No. of starts P1	
READ	205	No. of starts P2	
READ	208	Hi level occurrences	
READ	220	Overflow occurrences	
READ	1503/1505/1504/1506	Freq:Min/Start/Max/D	L280VFD only
READ	1501/1502	SpeedP1/SpeedP2	L280VFD only
READ	596	Flowmeter reading	
READ	136/223	P1/P2 current	
READ	74 ,2	Start 1 Level & delay	
READ	75, 5	Start 2 Level & delay	
READ	76 77	Stop 1 Level Stop 2 Level	
READ	70, 72	Level Range	
READ	1400	Pumped volume total	
READ	1402	Pumped volume/day	
READ	1645	Dynamic inflow	
READ	1024	Cycle inflow	L280CAP only
READ	1300	P1Capacity calcul.	L280CAP only
READ	1302	P2Capacity calcul.	L280CAP only
READ	1308	2P Capacity calcul.	L280CAP only
Read than ALM	270	Alarm register	
MAIN		P1/P2 ALTERN L280 v.1.0	CHOICE:ALT/P1 Lead / P2 Lead CHOICE:L280/L280CAP/L280VFD *

Once displayed, each defined screen will be active during 60 seconds if no key is pushed. After this period the default screen will be displayed.
To return to the default screen immediately, push **Back** key on the operator interface.
* Controller option (L280/L280CAP/L280VFD) is chosen before shipping (level2 password protected)

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5.2 PARAMETERS TO READ AND WRITE

If the default screen is displayed (no alarm), an operator can read and write the control system parameters. To have access to these functions, the PASSWORD is required.
The read and write parameters are given in table 6 below.

TABLE 6. SYSTEM READ-WRITE PARAMETERS

FUNCTION KEY	PLC REGISTER	PARAMETER	INITIAL VALUE	NOTES
Write - F3	-	Language F - French E - English	E - English	
Write-PREV-F3	102	New password	9	
WRITE	24 526	# of pumps inPARAllel (in simultaneous operation) Flush hour	2 24H	2- parallel operation 1-one pump only 24H-Flush disable
WRITE	2	Start 1 delay	10 s	
WRITE	5	Start 2 delay	10 s	
WRITE	8	Blocking delay P1	15 s	
WRITE	11	Blocking delay P2	15 s	
WRITE	20	Alarm delay	5s	On Power up only
WRITE	132	M1/M2 closing delay	10s	
WRITE	590/592	Flowmeter scaling	0-80l/s	
WRITE	70/72	Min/Max Level scaling	0-320 cm	
WRITE	74	Start 1 level	100 cm	
WRITE	75	Start 2 level	120 cm	
WRITE	76	Stop 1 level	50 cm	
WRITE	77	Stop 2 level	50 cm	
WRITE	107 106	High level alarm Low level alarm	200 cm 0 cm	
WRITE	96	P1 max. current	50 A	
WRITE	98	P1 max. current	50 A	
WRITE	111 601	P1 high current alarm Delay	35 A 30s	
WRITE	112 604	P2 high current alarm Delay	35 A 30s	
WRITE	100 607	P1 low current alarm Delay	0 A 30s	
WRITE	101 610	P2 low current alarm Delay	0 A 30s	
WRITE ON/OFF	-	ALTERNATE Mode Choice	ON	ON OFF toggle P1lead/P2lead
`WRITE	94	M-zone Inferior Level	80cm	L280CAP only
`WRITE	95	M-zone superior Level	90cm	L280CAP only
WRITE	1060	M-zone AREA	0 m^2	Required for inflow calculation
WRITE	113/2033	1P Cnom/Cref	0 l/s	Cnom-required for inflow calculation
WRITE	115/2035	2p Cnom/Cref	0 l/s	Cnom- required for inflow calculation
WRITE	114	Capacity histeresis	0 l/s	L280CAP only
WRITE	1503/1505/1504/1506	Frequency:Min/Start/Max/D	30/36/60/09 Hz	L280VFD only

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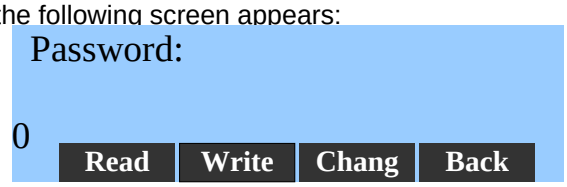
If **Write** function-key is pressed the following screen appears:



- Use ⇨⇦ arrow-keys to place the cursor on a digit 0 (Courser flashes on the value),

- Type the password using the numeric key-pad and press **ENTER** ↵ key. The PASSWORD should be a number composed of 4 digits maximum.

- If the password is correct the following message appears on the screen:

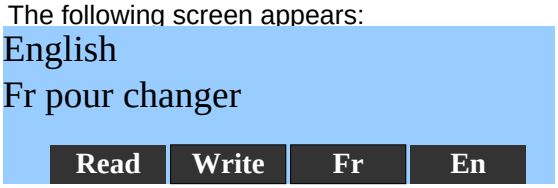
- Push the desired function-key
  - **Defau** to coldstart (default parameters)
  - **Write** to read or change another parameter
  - **Lang** to change display language
  - **Back** to return to default screen

-

LANGUAGE CHANGE:

- On default screen push **Write** key and type password to get following screen:

- Push **Lang** on a that screen
- The following screen appears:



or

- Active language is displayed
- Push **Fr** to change to French or **En** to change to English
- Press **Write** to write another parameter

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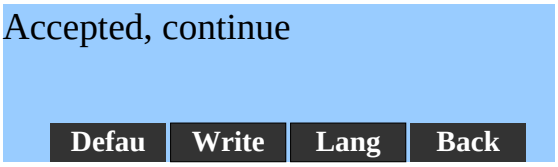
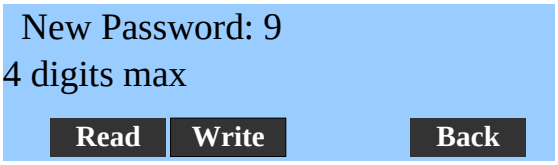
PASSWORD CHANGE:

- On default screen push **write**

- Type the password and push Enter



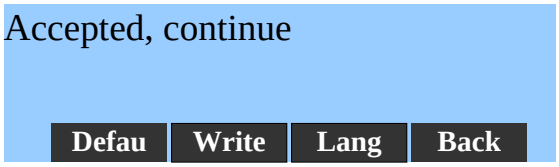
- Push PREV to return to previous screen
- Push **Chang**
- The following screen appears



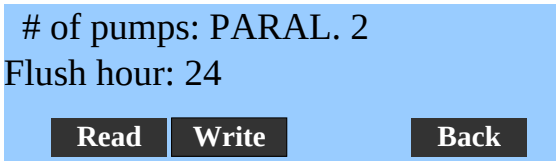
- Type your new password (composed of 4 digits max.)
- Press **ENTER**

NUMBER OF PUMP IN PARALLEL OPERATION, FLUSH hour & TIME DELAY CHANGE:

- On default screen push **Write** and type password to get following screen:



- Push **Write** function-key
- The following screen appears



- Type **1** in place **2** if no parallel operation is required.
- Push **Write** to change or read another parameter or **Back** to return to default screen
- If you push **Write** the first DELAY screen appears:

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- Use ⇨⇦ arrow-keys to place the cursor
- Type the new value
- Press **ENTER**
- Push **Write** function-key to read or write other delay
- Repeat four previous steps to change the time delay value
- Push **Write** to change or read another parameter or **Back** to return to default screen

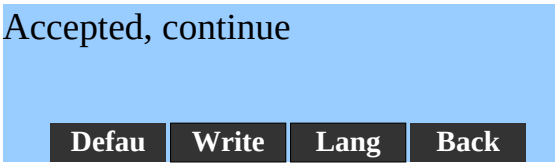
LEVEL PARAMETERS CHANGE:

- If you push **Write** function-key on the last Delay screen
- The first LEVEL screen appears:

- Use ⇨⇦ arrow-keys to place the cursor
- Type new value (instead of 0) if needed
- Press **ENTER**
- Push **Read** function-key to read or write other level parameter or **Back** to return to default screen

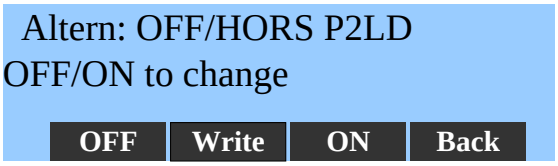
ALTERNATION MODE DISABLE:

- On default screen push **write** and type password to get following screen:



- Push **Write** function-key consecutively to get the screen

- Push **OFF** function-key to disable the alternate mode
- The following screen appears:



- Now you are in mode P2 leading pump
- To change for P1 leading pump push **OFF** again (consecutive push of **OFF** toggles between P1lead & P2lead)
- Push **ON** to back to alternate mode or
- Push **Back** to return to default screen:

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Once displayed, each defined screen will be active during 60 seconds if no key is pushed. After this period the default screen will be displayed.

To return to default screen immediately push **Back** key on the operator interface.

PUMP CAPACITY CALCULATION PARAMETERS CHANGE (FOR L280CAP ONLY)

- If the controller is in L280CAP mode and you push **Write** function-key on the ALTERNATE screen the first CAPACITY CALCULATION screen appears:

- Type the value of the M-zone (Measure zone) INFerior level (see paragraph Pump Capacity Calculation for details)
- Press **ENTER**
- Press function key **Write** to read or set other parameter of CAPACITY CALCULATION

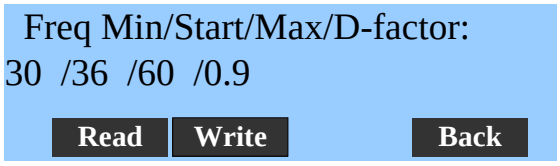
PUMP CURRENT PARAMETERS CHANGE

- If you push **Write** function-key on the last CAPACITY CALCULATION screen
- The first CURRENT screen appears:

- Type the value of the P1 pump Maximum current (value of CT range divided by the number of wire turns in the CT's window)
- Press **ENTER**
- Press function **Write** to read or set other parameter of CURRENT

VFD CONTROL PARAMETERS CHANGE (For L280VFD only)

- If you push **Write** function-key on the last CURRENT screen
- The VFD parameter screen appears:



- Type the values of the frequencies:

Minimum (for 4mA output)
Start (frequency when the pump start)
Maximum (maximum frequency for 20mA output)
D-factor (0.2..1.0 a value of the ratio defining the level when the maximum frequency is reached) see paragraph VFD control operation for details

- Press **ENTER**
- Press function **Write** to read or set other parameter or press **Back** to return to the default screen

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5.3 ALARM SCANNING

If one or more alarms described in the chapter 4.5 are activated the corresponding alarm-messages will appear on the screen of the operator interface, following the FAULT message. All displayed alarm messages are bilinguals. During the alarm's scanning, each screen is displayed for 2 seconds.

The list of alarm-messages is given in the table 7.

TABLE 7. ALARM- MESSAGES

MESSAGE	Notes
SURCHARGE P1 P1 OVERLOAD	or DEFAUT M1 M1 CLOSING FAULT
FUITE P1 LEAKAGE P1	
HAUTE TEMP. P1 P1 HIGH TEMP.	
SURCHARGE P2 P2 OVERLOAD	or DEFAUT M2 M2 CLOSING FAULT
FUITE P2 LEAKAGE P2	
HAUTE TEMP. P2 P2 HIGH TEMP.	
HAUT NIVEAU HIGH LEV. **201.** cm	present value of the level is displayed
PERTE DU RESEAU POWER FAILURE	
BAS NIVEAU LOW LEV. **11.5** cm	present value of the level is displayed
BAS COURANT P1 LOW CURR< **10** A	alarm set value of the pump's current is displayed
HAUT COURANT P1 HIGH CURR> **35** A	alarm set value of the pump's current is displayed
BAS COURANT P2 LOW CURR< **10** A	alarm set value of the pump's current is displayed
HAUT COURANT P2 HIGH CURR> **35** A	alarm set value of the pump's current is displayed
DEFAUT/FAULT niveau/level: **202.4** cm	present value of the level is displayed

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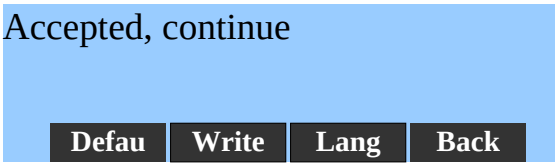
5.4 SYSTEM COLDSTART

During the coldstart the default values of all system parameters (see table 4 for details) are written to the specific data memory registers.

The coldstart is done automatically during the PLC program first scan. An operator using the operator interface can also do it.

COLDSTART:
The coldstart is done automatically during the PLC program first scan.
An operator using the operator interface can also do it.

- On default screen push **Write** and type password to get following screen:



- Push and hold **Defau** function-key
- The following screen will appear

- After 10 s screen change to:

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5.5 ALARM'S REGISTER

Up to 16 alarms with date and time can be stored in PLC registers %R300-%R400 following the FIFO rule (first in-first out).

To CLEAR alarm's register an operator should push **Read** and than push and hold **ALM** function key during 10 seconds.

5.6 DISPLAY OF ALARM'S REGISTER

To read alarm's register :

- On DEFAULT SCREEN push **Read** function key
- Push **ALM** function key
- first screen of the alarm's register appears giving the number of alarms since the last clearing

- Push **ALM** function key
- The most recent alarm appears with date :***month- day*** and**:**
  time: ***hour :minutes***

month - day ***hour : minutes***

NOTE: The number of the alarms displayed on the first screen can be higher than 16, but only last 16 alarms will stay in PLC memory.

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APPENDICE 1

ANNUNCIATOR DRAWINGS:

- Alarm annunciator for PLC : Annunciator face-plate with descriptions (LOGIMAC® 280 -AP) -dwg. # C-51 15 34

- Alarm annunciator for PLC : Printed circuit & interconnection schematic - dwg. # 2603-A2

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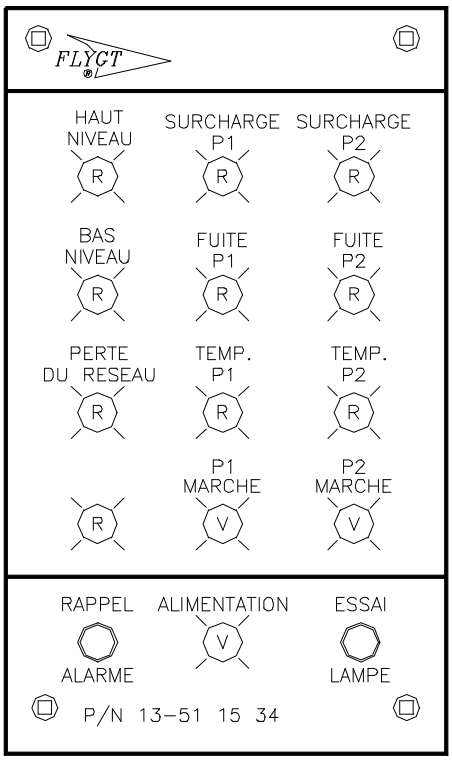

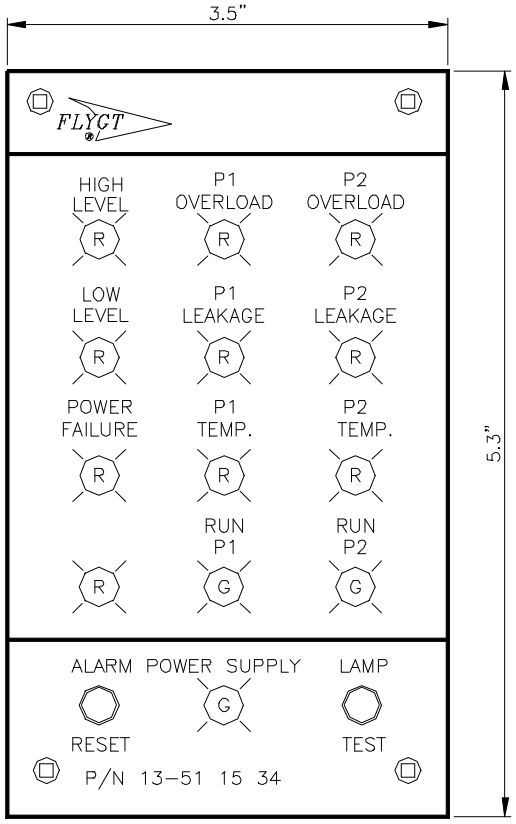

TITRE/TITLE	PLAQUE D'ANONCIATEUR REVERSIBLE AVEC LES DESCRIPTIONS (LOGIMAC 280) REVERSIBLE ANNUNCIATOR PLATE WITH DESCRIPTIONS (LOGIMAC 280)
DESCRIPTION	REVERSIBLE ANNUNCIATOR PLATE WITH DESCRIPTIONS (LOGIMAC 280). WHITE LETTERING ON A BLACK BACKGROUND
VERIF./CHK'D. : L.J.L.	APPR. L.J.L.
INITIAL APPLICATION PREMIERE :	SP-CP-7.0
FOURNISSEUR/ SUPPLIER	DATE 95-05-30
FLYGT N/P : P/N : C-51 15 34	REV. 2

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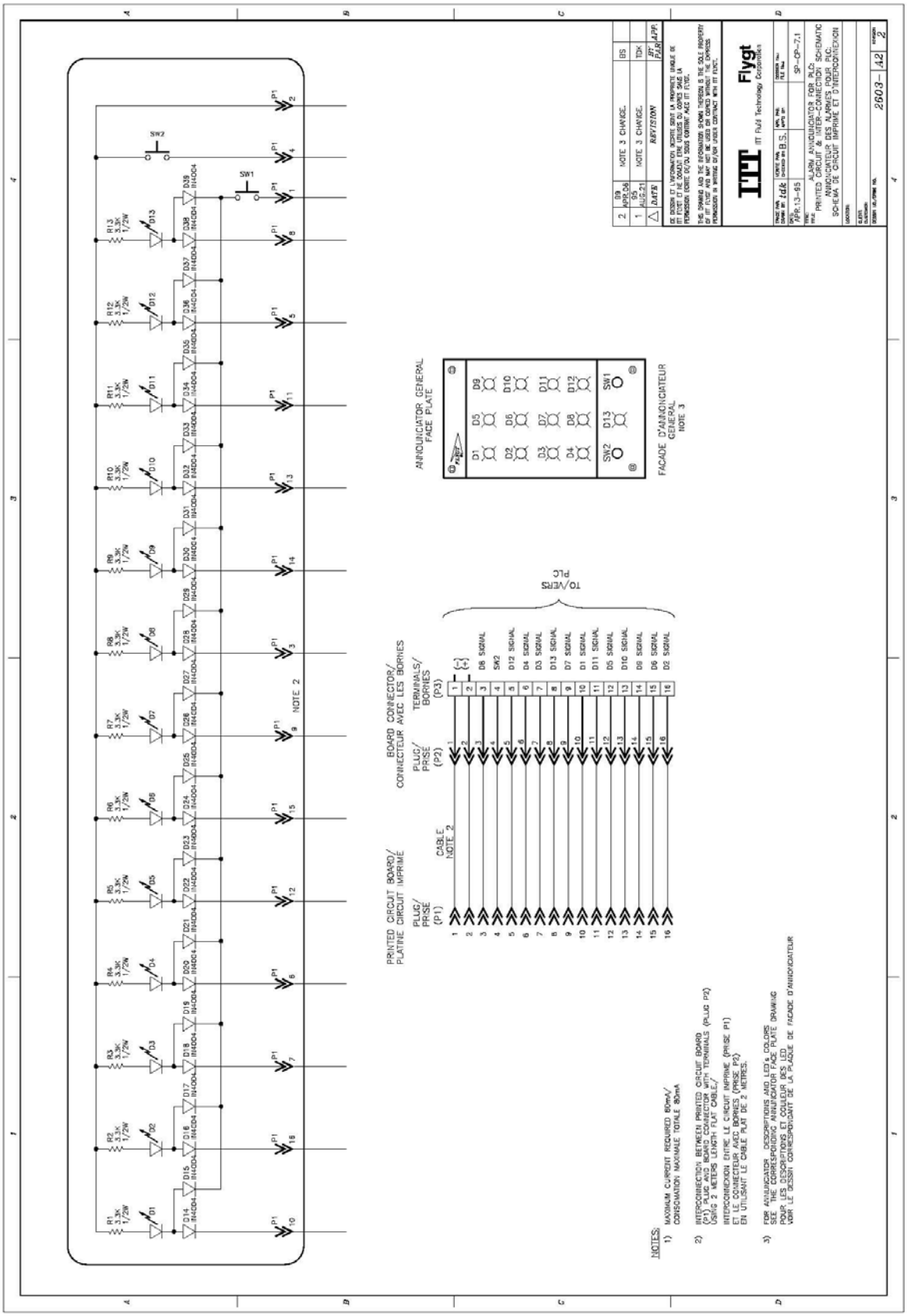
NOTE 3 CHANGE.
NOTE 3 CHANGE.
REVISION
ANNUNCIATOR GENERAL FACE PLATE
FACADE D'ANNONCIATEUR GENERAL NOTE 3
PRINTED CIRCUIT BOARD/ PLATINE CIRCUIT IMPRIME
PLUG/ PRISE (P1)
CABLE NOTE 2
BOARD CONNECTOR/ CONNECTEUR AVEC LES BORNES
PLUG/ PRISE (P2)
TERMINALS/ BORNES (P3)
TO/VERS PLC
NOTE 2
NOTES:
1) MAXIMUM CURRENT REQUIRED 80mA/ CONSOMMATION MAXIMALE TOTALE 80mA
2) INTERCONNECTION BETWEEN PRINTED CIRCUIT BOARD (P1) PLUG AND BOARD CONNECTOR WITH TERMINALS (PLUG P2) USING 2 METERS LENGTH FLAT CABLE./ INTERCONNEXION ENTRE LE CIRCUIT IMPRIME (PRISE P1) ET LE CONNECTEUR AVEC BORNES (PRISE P2) EN UTILISANT LE CABLE PLAT DE 2 METRES.
3) FOR ANNUNCIATOR DESCRIPTIONS AND LED's COLORS SEE THE CORRESPONDING ANNUNCIATOR FACE PLATE DRAWING/ POUR LES DESCRIPTIONS ET COULEUR DES LED VOIR LE DESSIN CORRESPONDANT DE LA PLAQUE DE FACADE D'ANNONCIATEUR
ITT Flygt
ITT Fluid Technology Corporation
ALARM ANNUNCIATOR FOR PLC
PRINTED CIRCUIT BOARD SCHEMATIC
ANNONCIATEUR DES ALARMES POUR PLC
SCHEMA DE CIRCUIT IMPRIME ET D'INTERCONNEXION
2603-
SP-CP-7.1

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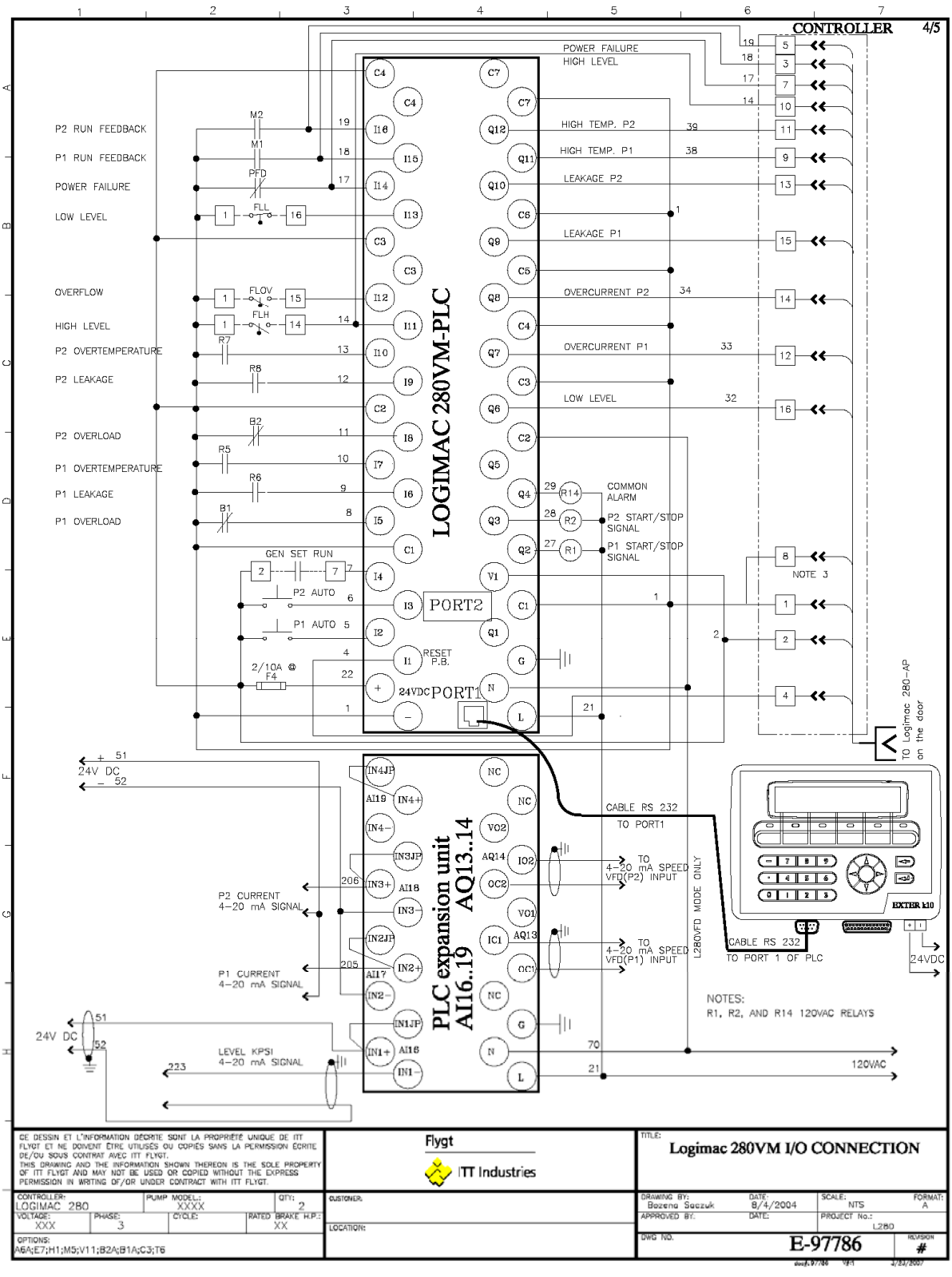

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Flygt
ITT Industries

TITLE: Logimac 280VM I/O CONNECTION

CONTROLLER:	PUMP MODEL.:	QTY:
LOGIMAC 280	XXXX	2
VOLTAGE:	PHASE:	CYCLE:	RATED BRAKE H.P.:
XXX	3		XX

OPTIONS: A6A;E7;H1;M5;V11;B2A;B1A;C3;T6

CUSTOMER:

LOCATION:

DRAWING BY:	DATE:	SCALE:	FORMAT:
Bozena Seczuk	8/4/2004	NTS	A
APPROVED BY:	DATE:	PROJECT No.:	
		L280	

DWG NO. E-97786 REVISION #

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